

REMARKS

Claims 1-15 are pending in this application. By this Amendment, claims 3 and 9 are amended. No new matter is added.

Entry of the amendments is proper under 37 C.F.R. §1.116 since the amendments:

(a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration since the amendments amplify issues previously discussed throughout prosecution; and (c) place the application in better form for appeal, should an appeal be necessary. Entry of the amendments is thus respectfully requested.

I. Claim Rejections Under 35 U.S.C. §103

Claims 1-15 are rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 5,645,706 to Matsuda. The rejection is respectfully traversed.

Matsuda does not disclose or suggest each and every feature recited in the rejected claims. For example, Matsuda fails to disclose or suggest an electrolytic phosphate chemical treatment method of forming a film composed of a phosphate compound and a metal that is reduced and precipitated from an ionic state on the surface of a metal material article to be treated, comprising: performing the electrolytic treatment on the article in a phosphate chemical treatment bath by contacting the metal material article having electrical conductivity with the phosphate chemical treatment bath containing phosphate ions, phosphoric acid, nitrate ions, metal ions that form a complex with the phosphate ions in the phosphate chemical treatment bath, and metal ions for which the dissolution-precipitation equilibrium potential at which the metal ions dissolved in the phosphate chemical treatment bath are reduced and precipitate as metal is equal to or greater than -830 mV, which is the cathodic reaction decomposition potential of water when indicated as the hydrogen standard electrode potential, and is substantially free of metal ions other than those which are a component of the

film; wherein, the oxidation-reduction potential (ORP) of the phosphate chemical treatment bath indicated as the potential relative to a standard hydrogen electrode, is maintained at equal to or greater than 700 mV.

Matsuda conducts an electrolytic treatment using a conventional non-electrolytic treatment bath. Because Matsuda is using a conventional non-electrolyte treatment bath, a sludge is unavoidably formed. For example, Matsuda discloses that a substance to be treated is subjected to electrolytic treatment while removing the sludge (Abstract of Matsuda). Matsuda also discloses a method used to remove the solid matter (sludge) from a chemical treatment bath. In contrast, the subject matter of this application has as an object of the invention to avoid sludge in the treatment bath.

The Office Action points out that Matsuda discloses a less restrictive method of managing the chemical treatment path by not introducing a chemical such as caustic soda (Na^+), but rather adding the main ingredients (an acidic chemical containing phosphoric acid, nitric acid, zinc, etc.) and therefore avoids metal ions other than those which are a component of the film. However, in response to the changing oxidation-reduction potential (ORP), in the claims, the ORP is advantageously used for monitoring the treatment of the bath. In contrast, use of the electric conductivity or the hydrogen ion concentration (pH) as disclosed in Matsuda are inadequate for monitoring the treatment bath of the rejected claims. For example, the use of the electric conductivity as disclosed in Matsuda is inadequate for monitoring the small concentration changes which occur in the chemical bath of the pending claims. Furthermore, the pH is merely a hydrogen ion concentration whereas the ORP relates to a concentration of all ions such as H^+ , NO_3^- , Zn^{2+} , Fe^{2+} , Ni^{2+} , and H_3PO_4 and the treatment bath. Thus, even disregarding the use of caustic soda which provides an Na^+ ion, which is a metal ion other than an ion which is a component of the film, Matsuda fails to disclose each and every feature of the rejected claims.

Regarding claim 3, Matsuda fails to disclose or suggest the additional features recited in the claim as amended. For example, Matsuda fails to disclose or suggest the electrolytic phosphate chemical treatment method according claim 1, further comprising dissolving an amount of Fe ions into the treatment bath from an Fe electrode and the article to be treated, when performing a cathodic treatment of said article to be treated and using the Fe electrode as the electrode that dissolves in the treatment bath, is controlled in order to make said ORP of the phosphate chemical treatment bath equal to or greater than 700 mV and maintain the amount of Fe ions within a solubility limit of Fe^{3+} ions.

Regarding claim 9, Matsuda fails to disclose or suggest each and every feature recited in the claim as amended. For example, the electrolytic phosphate chemical treatment method according to claim 1, wherein N_2O_4 gas generated and dissolved in a treatment tank is removed from the treatment bath by separating the treatment tank into an electrolytic treatment tank that carries out the electrolytic treatment and an auxiliary tank that does not carry out electrolytic treatment, circulating the treatment bath between the two tanks, and providing a mechanism that opens liquid of the treatment bath to the atmosphere either between the electrolytic treatment tank and the auxiliary tank or within the electrolytic treatment tank and the auxiliary tank, as a means of separating the N_2O_4 gas formed in the treatment bath accompanying the electrolytic treatment of the treatment bath.

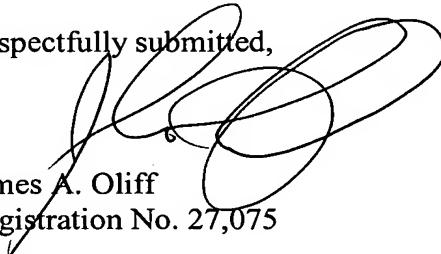
Therefore, because Matsuda fails to disclose each and every feature recited in the rejected claims, withdrawal of the rejection of claims 1-15 is respectfully requested.

II. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-15 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,


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Attachment:

Notice of Appeal to the Board of Patent Appeals
and Interferences and Petition for Extension of Time

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